

# The Doc's Battery Test Report

Battery Details	
Brand	Energiser 750
Size	AAA AA C D 9V 6V
Type	Ni-MH Ni-Cd RAM Alkaline Titanium
Current in mAhs	750
Stated Voltage	1.5 volts 1.2 volts
Number of batteries	Single Set of 2 Set of 4
Battery Set used	Set 1
Times charged before test started	13
Charger used to charge	Rezap RBC883 Vanson Speedy Box UBA4
Time Batteries charged in charger	See UBA graph.

Test Procedures	
Spreadsheet name	Energiser750NiMH-AAA-Set1.123 (Discharge data file)
UBA file name	Energiser750NiMH-AAA-Set1-13.uba (Charge file)
Select Resistance 5 or 10 ohms	5 ohms 10 ohms
Voltage cut off	3.5 volts 3.6 volts
Date of test	10/12/03

Summary of test	
Voltage	Starting voltage 5.5 volts, cut off voltage 3.6 volts
Test duration	85.4 minutes
Max Battery Temp	31.6 degrees Celsius
Min Battery Temp	29.6 degrees Celsius

## Methodology

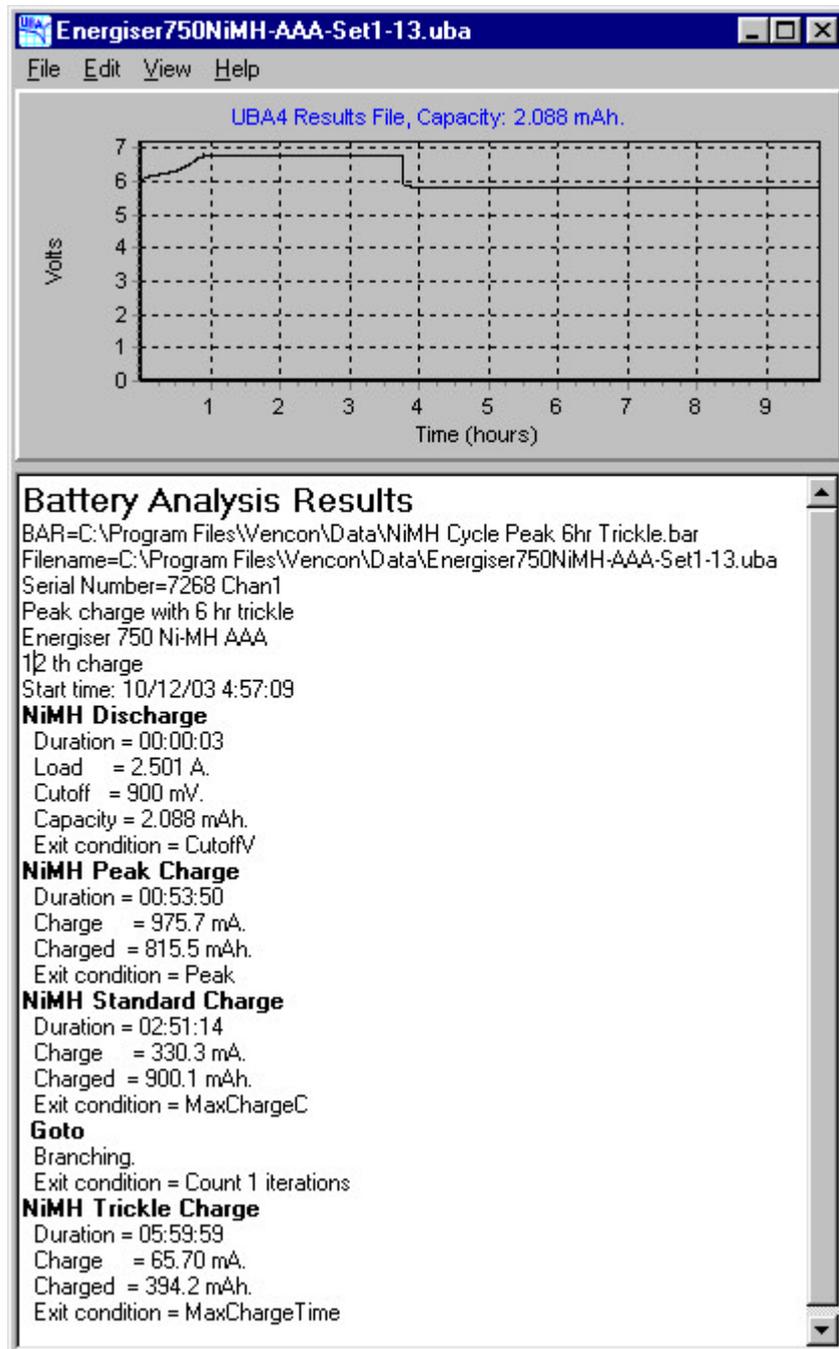
The battery set being tested has been charged at least 5 times. The battery set is charged in a Universal Battery Charger (UBA4). It is then tested under a load of 10 ohms in the scientific dooverlackie (the AA batteries are tested at 5 ohms). In this test the battery set was also charged in several different types of charger. The Doc has created a charge cycle specifically for test purposes. The UBA4 runs a peak charge cycle, once completed the battery set is automatically put on a trickle charge for 6 hours. The following pages give various data, including:

1. charging information from the UBA4;
2. a graph of the voltage during the test (cut off voltage being 3.6 volts);
3. a graph of the battery temperature during the test;
4. a graph of the battery temperature verse ambient air temperature during the test;
5. a graph comparing performance of the Energiser 750 to primary aklaine cells; and
6. a graph comparing the charging performance of different chargers with the Energiser 750s.

# The Doc's Battery Test Report

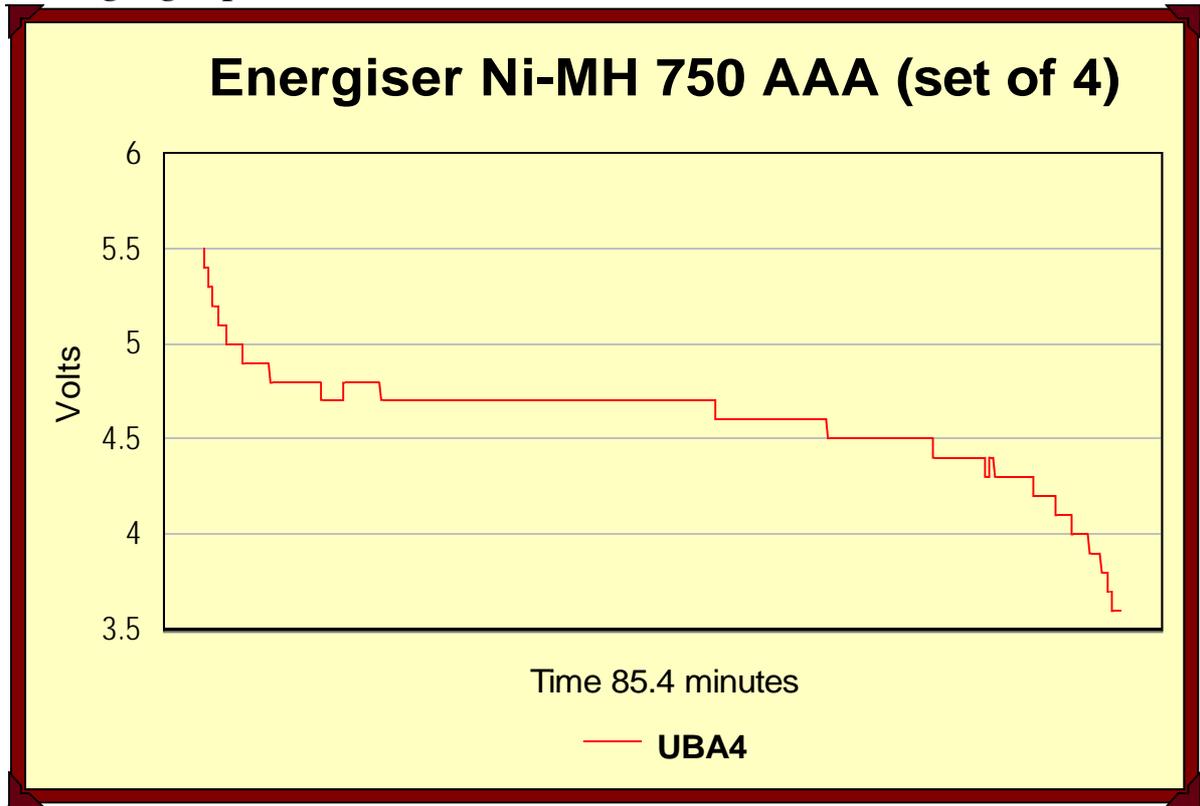
## UBA report

The graph and charging information from the UBA4. The Doc incorrectly typed in charge number 12, in fact it was the 13<sup>th</sup> charge (give the Doc a smack).

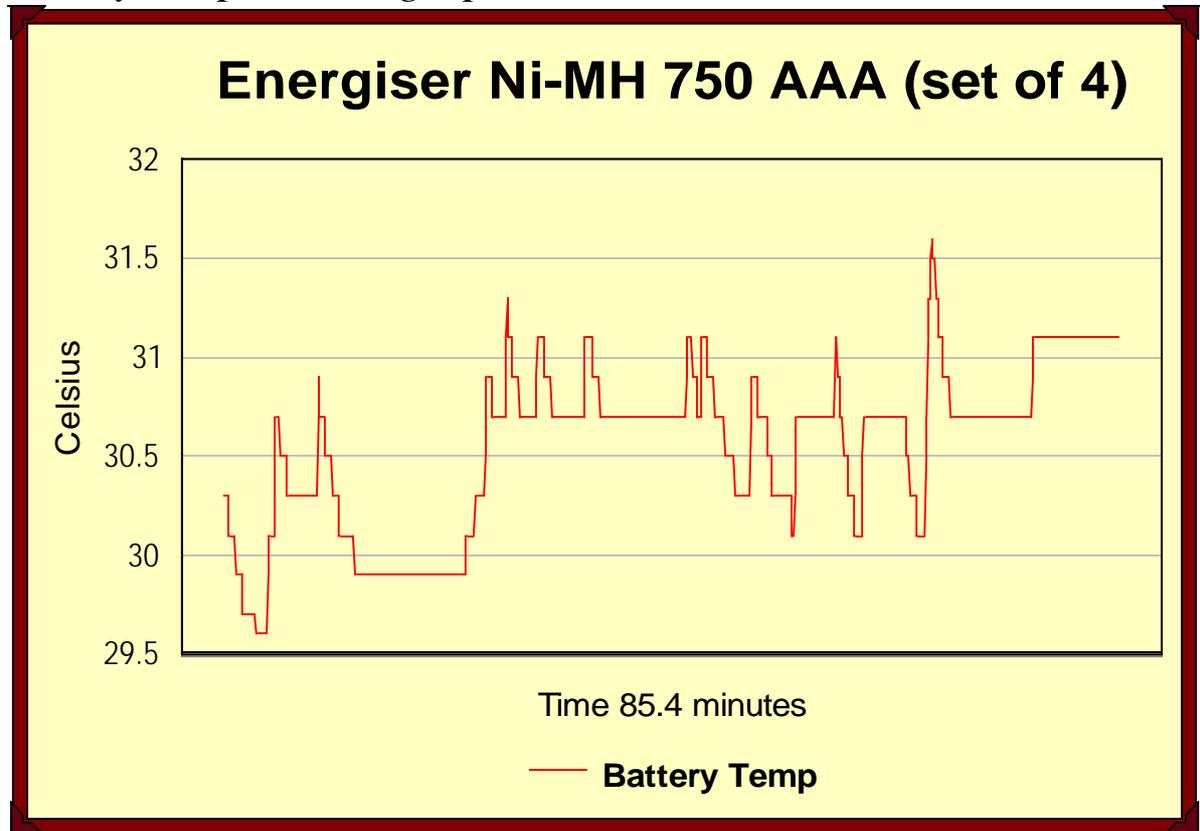


# The Doc's Battery Test Report

*Voltage graph*



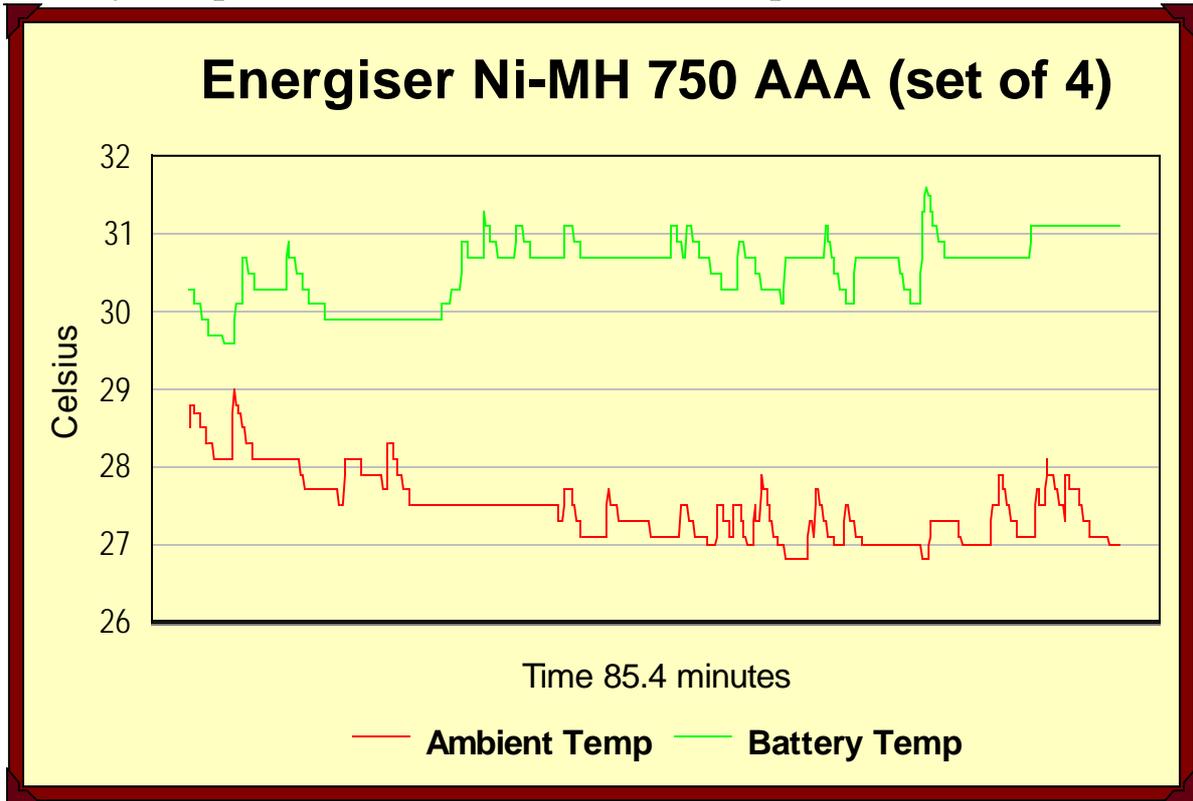
*Battery temperature graph*



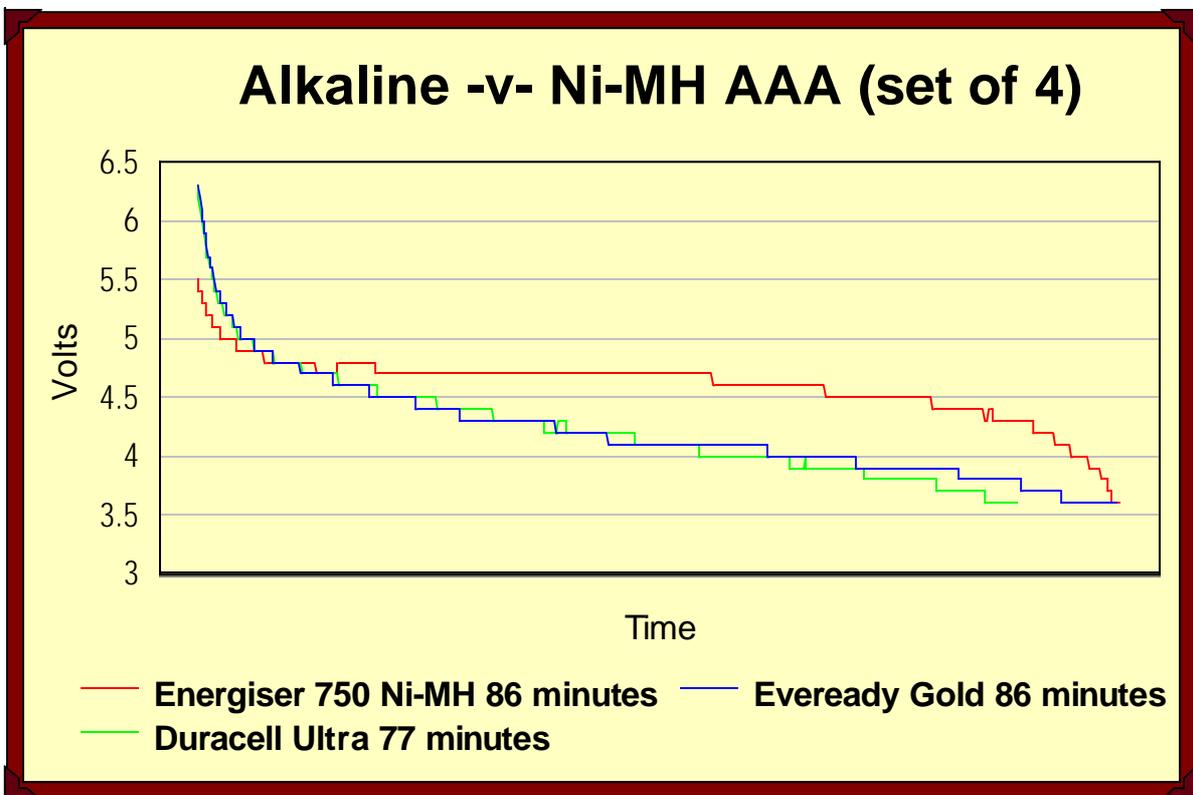
With AA batteries the battery temperature rises as the battery discharges more energy. The relationship is not so clear cut with AAA batteries, probably due to the batteries being less powerful and the load being 10 ohms rather than the 5 ohms used for AA's.

# The Doc's Battery Test Report

Battery temperature -v- Ambient air temperature



Alkaline -v- Ni-MH



This graph compares the performance of the Energiser 750s against the Duracell Ultra and Eveready Gold - both primary cell alkaline batteries.

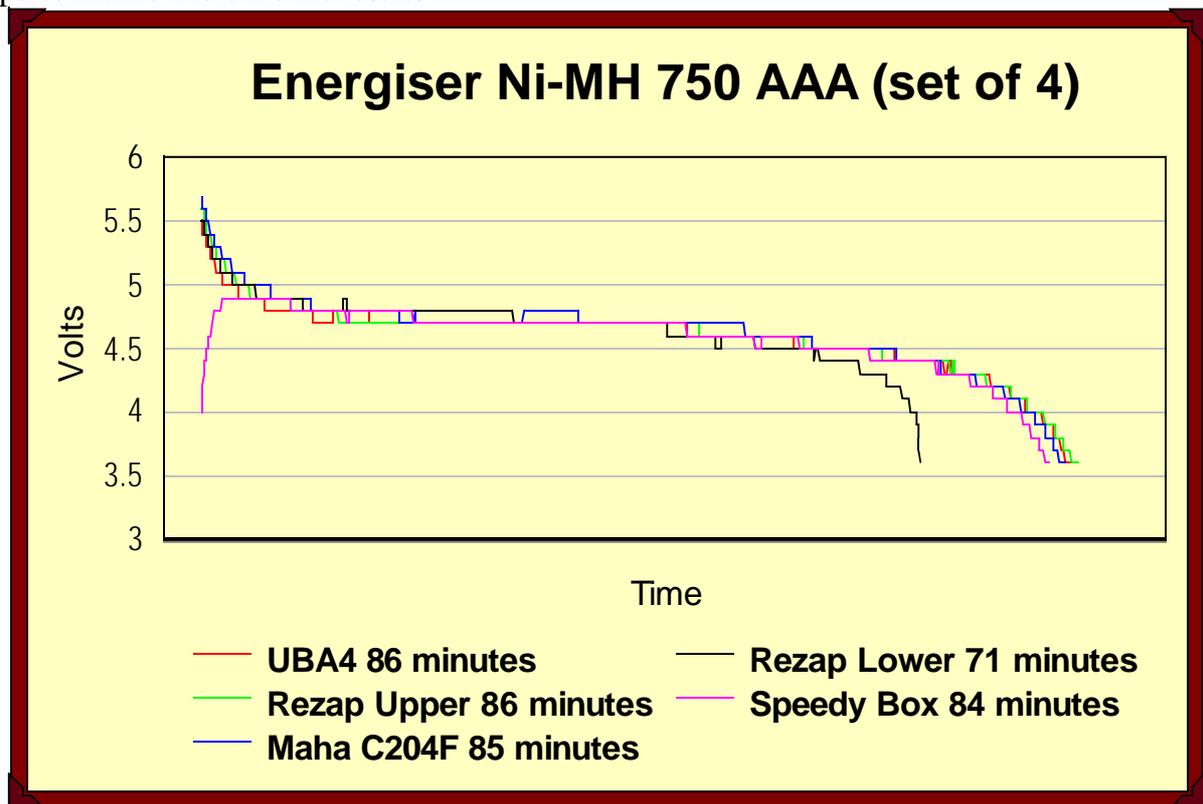
# The Doc's Battery Test Report

A couple of observations:

1. the overall performance is similar between all three batteries (times are rounded up to next full minute);
2. primary cell alkaline batteries have a higher starting voltage because they are rated 1.5 volts, whereas the Energiser 750s are rated at 1.2 volts;
3. the Energiser 750s lose some voltage initially then operate between 4 and 4.5 volts for the majority of the time. They then lose voltage quickly towards the end. Primary cell alkalines tend to lose voltage more evenly over the test cycle;
4. with AAA batteries there is no real difference in performance between the battery types. In contrast, the Sanyo Ni-MH AA's lasted almost twice as long as the primary cell alkaline AA's. This makes sense since there is greater demand for higher performance out of AA sized batteries. You do not need to push the limits with AAA batteries, since the manufacturer can more easily change the battery size for the device.

## Charger comparison

The Energiser battery set was then tested in various battery chargers to compare charging performance. Here are the results:



To simplify the graph legends, The Doc has rounded the run times up to the next full minute. The performance difference between using the upper charge contact on the Rezap charger compared to the lower contact is self evident. The upper contact is the winner.

The performance between the 4 chargers is almost the same (if you exclude the lower charging contact on the Rezap). You will note that with the Speedy Box charge, the battery takes about 1 minute to reach the maximum voltage. The Doc ran the test twice and on both occasions the same thing happened. For some reason this only occurs with the Speedy Box.

# The Doc's Battery Test Report

The Doc is not sure why this happened as this is the only example he has seen in the last 3 months of testing.

While all chargers performance was almost identical here. The same was not the case with the higher rated Sanyo 2100 Ni-MH AA's. In those tests there is a marked difference between charger performance. The lower rating of the Energiser 750 mAh AAA's, allows all the chargers to fully charge the battery set, which is not the case with higher capacity Ni-MH's. The lesson is clear, if you want to use higher capacity Ni-MH batteries and want a full charge, charger selection is critical. Charger selection is less important with batteries of lower capacity.

## *Conclusion*

The performance of AAA's batteries is not in the same league as their bigger brother, the AA's. AAA's are used less often than AA's in both toys and high drain devices. AAA's are common in remote controls where the power demands are lower. With these less power hungry devices, the battery set is more likely to self discharge before being exhausted in use. In the Doc's view, build quality and the number of recharges are more important than raw capacity. The Energisers 750 mAh Ni-MH are a good all round performer, idea for backlite remote controls.

<b>Run Time (10 ohm)</b>	<b>85.4 minutes</b>
<b>Battery build quality</b>	<b>Good</b>
<b>Place of Origin</b>	<b>Japan</b>
<b>Cost (set of 4)</b>	<b>AUD\$18.00</b>

*Report date: 13 December 2003*

<http://www.users.on.net/mhains/>

[thedoc@internode.on.net](mailto:thedoc@internode.on.net)